Vol. 35 No 11

BULLETIN

OF THE

TORREY BOTANICAL CLUB

NOVEMBER, 1908

The Boleti of the Frost herbarium

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(WITH PLATES 36–40)

A brief account of the life and botanical work of C. C. Frost was published in the August number of Torreya, and the reader is referred to that account as a general introduction to the present more critical paper, which was made possible by the recent generous loan of the Frost collection of Boleti by the University of Vermont.

This collection is very rich in type material, containing practically all of Frost's published species and a number of species still in manuscript, which I have treated separately. A number of sheets of type specimens, or type duplicates, twenty or more, were sent to C. H. Peck at Albany, where they are still well preserved. Peck never saw Frost, nor the remainder of his herbarium. He began work near the close of Frost's active life, but his advantages appear to have been greater, and we find Frost turning to him in 1874 for certain determinations and for assistance with the Amherst Catalogue.

There are a number of references in Frost's notes and descriptions to the opinions of Peck regarding various species. There are also four type specimens, or co-types, in the collection, which were sent him by Peck, namely, *B. ampliporus* Peck, *B. gracilis* Peck, *B. elbensis* Peck, and *B. paluster* Peck, but these are now, unfortunately, in very poor condition.

Frost kept a separate list of spore measurements of the Boleti; he was not particular about spore coloration. I have made a careful examination of his types microscopically and find his figures usually correct.

[The BULLETIN for October, 1908 (35: 471–516) was issued 3 N 1908.]

The following commentary represents my present views regarding Frost's published and unpublished species. In connection with the latter, I have purposely avoided the publication of anything that would suggest a description, although Frost's diagnoses are in most cases quite complete.

PUBLISHED SPECIES

BOLETUS ALBUS Peck.

Represented by three fine plants. The species is only an albino form of *B. granulatus.*

BOLETUS ALVEOLATUS B. & C.

There are no specimens bearing this name in the Frost herbarium. An excellent description, however, of this species was published in the Catalogue of Boleti of New England.

BOLETUS AURIPORUS Peck.

Seven good specimens are found under this name, which Frost always spelled with an extra "*s*" (*aurisporus*), probably because the spores as well as the tubes are yellow. These specimens, now about forty years old, have retained the yellow color in their tubes to a remarkable extent.

BOLETUS BICOLOR Peck.

Represented by eight faded and moulded plants.

BOLETUS BOVINUS L.

Represented by eight fair to poor, more or less moulded, specimens, which may be referred almost certainly to *B. granulatus.*

BOLETUS CASTANEUS Bull.

There are two sheets in the collection, one containing five specimens and the other six, all well preserved.

BOLETUS CHROMAPES Frost.

Represented by seven good plants.

BOLETUS CHRYSENTERON Fries.

Three faded plants represent this very common species.

BOLETUS COLLINITUS Fries.

One sheet contains three very poor plants collected in pine woods in autumn. The other sheet, containing five good specimens, was first labeled "*B. granulatus*" and later changed to *B. collinitus.* The first determination was correct for both sheets.

BOLETUS CYANESCENS Bull.

Six good plants are preserved. Frost has marked it "rare."

BOLETUS DECORUS Frost.

Represented by three good specimens, which may be referred to *B. edulis.*

BOLETUS EDULIS Bull.

One sheet contains two poor plants with their stems eaten away by insects. On the other sheet is one very poor specimen, which may be *B. edulis*, and a fine plant that is certainly *B. ornatipes.* In a letter to Professor Peck, dated Nov. 27, 1874, Frost says: "Have you Curtis' full description of *Boletus retipes*? From all I can gather it seems to me that the specimen I sent you as such is the true one. What you describe as such I suspect is a variety of *B. edulis*, it indeed does it exactly. If Bulliard's figure is the true species, then Sowerby's must be a variety, for they are very much unlike in appearance but microscopically they are the same species. What you describe is abundant here. Unless I greatly mistake, it is another variety of *Boletus edulis.* I am familiar with all three of them."

BOLETUS ELEGANS Schum.

This name is doubtfully assigned by Frost to a specimen from Sprague and to one collected by himself, neither of which is very well preserved. The former is *B. luteus* and the latter is possibly *B. Ravenelii.*

BOLETUS FELLEUS Bull.

One sheet contains a single large plant cut in half. It is well preserved. The other sheet contains five plants, four of them apparently *B. ornatipes*, and a single one, in the lower corner on the right, *B. felleus.*

BOLETUS FERRUGINEUS Frost.

There is one sheet under this name containing five excellent specimens collected in 1867 under oak trees near borders of woods. A full description is written at the bottom of the sheet. I cannot distinguish the species from *B. felleus.* (PLATE 36.)

BOLETUS FIRMUS Frost.

Two poor plants represent this species, which is probably not distinct from *B. luridus* Schaeff. In *B. luridus* the stem is usually

punctate, but often reticulate at the top or for some distance downward.

BOLETUS FLAVIDUS Fries.

Most of the specimens appearing under this name in the Frost collection belong to what we know in this country as *B. americanus* Peck. They were collected in pine woods and grassy places, and are mostly very poorly preserved. Twenty specimens are glued to sheets and five are contained in a small paper box. A larger box similarly labeled contains seven good specimens of *B. luteus.*

BOLETUS FLAVUS With.

Represented by about fifteen moulded specimens in a paper box, which may doubtless be referred to *B. luteus.*

BOLETUS FROSTII Russell.

Represented by six sheets, containing in all twenty-one good plants and seven in fair condition. Where the habitat is mentioned, it is "borders of woods." The name is written "*B. Frosti*" or "*B. Frostii*" indifferently. The species is not distinct from *B. alveolatus.*

BOLETUS GRANULATUS L.

Two sheets, containing ten specimens in a fair state of preservation, represent this common species.

BOLETUS GRISEUS Frost.

Represented by three sheets containing thirteen good specimens. The species was published by Peck in the 29th Report of the N. Y. State Museum of Natural History. Dried specimens may be easily confused with *B. ornatipes*, but the white color of the tubes readily distinguishes it in the field. Frost's notes refer to *B. griseus* with intensely yellow tubes, which was evidently *B. ornatipes.*

BOLETUS INNIXUS Frost.

Represented by a sheet containing three good plants collected in grassy woods in 1866; also a sheet containing two small poorly preserved specimens united at the base. *B. innixus* is plainly an abnormal or distorted form of *B. auriporus*, representing the maximum of size and irregularity in the tubes and a reclining habit not usual in typical plants. The descriptions are practically identical, and the type specimens of *B. innixus* show the characteristic yellow

color of the tubes of *B. auriporus* still well preserved. The specimens united at the base suggest another synonym, *B. caespitosus* Peck, in which the subcespitose character and the subcuticular reddish tint were emphasized. (PLATE 37.)

BOLETUS LIMATULUS Frost.

This species, reported rare by Frost, was collected in hilly woods in July, 1869. One sheet contains five fair plants, with full description, and another three plants well preserved. They may all be referred to *B. edulis*.

BOLETUS LUTEUS L.

None of the specimens are good, most of them being moulded. There are three sheets containing fourteen plants, one of the sheets having "*B. flavidus*" written on it in pencil.

BOLETUS MAGNISPORUS Frost.

Represented by three sheets containing six poor specimens collected in woods and thickets. The species is not distinct from *B. luridus*. The spores are oblong-elliptical, decidedly ferruginous-fulvous, 12–16 μ × 4–5 μ. Frost makes them 16.5 μ × 6 μ. The color of the spores is probably greenish in fresh specimens.

BOLETUS MINIATO-OLIVACEUS Frost.

Represented by two sheets containing five excellent specimens collected in woods and borders.

BOLETUS ORNATIPES Peck.

Represented by two sheets containing ten good plants. See remarks under *B. edulis*, *B. felleus*, and *B. retipes*.

BOLETUS PALLIDUS Frost.

Represented by three sheets, containing three excellent specimens and six more or less moulded ones. On one sheet is a full description. (PLATE 38.)

BOLETUS PECKII Frost.

This species, published by Peck in the 29th Report, does not appear in the collection.

BOLETUS PICTUS Peck.

See *Boletus Murraii*, in the list of unpublished species.

BOLETUS PIPERATUS Bull.

The collection contains two sheets of this species, one with five poor plants and one with four good ones. The habitat is given as "woods and grass grounds."

BOLETUS RAVENELII B. & C.

There is one sheet with seven excellent specimens, in which even the colors are well preserved. Above "*B. subchromeus* Frost" is written "*B. Ravenelii* B. & C. first by publication."

BOLETUS RETIPES B. & C.

In a copy of his Catalogue presented to Mr. C. G. Pringle in 1876, this name is scratched and replaced by *B. ornatipes*, with the statement that "*B. retipes* is not a good Vermont species." See remarks under *B. edulis*.

BOLETUS ROBUSTUS Frost.

Represented by three good plants collected in 1862 in the borders of shady woods. A full description accompanies the specimens. On account of *Boletus robustus* Fries, described earlier from Costa Rica, Peck assigned a new name, *B. eximius*, to this species.

BOLETUS ROXANAE Frost.

Four fair specimens with full description and an outline sketch appear on one sheet. Another sheet has four good specimens, and still another contains five in fair condition, at least one of which is *B. castaneus*. This same sheet contains also a good specimen of the yellow-stemmed variety of *B. Roxanae*, first reported by Peck as *B. sulfureus* and later changed to var. *auricolor*. *B. multipunctus* Peck is probably not distinct from *B. Roxanae*. (PLATE 39.)

BOLETUS RUBEUS Frost.

Frost found this species in deep woods. There are three sheets, containing eight good plants and four rather poor ones. A study of these various specimens in connection with the description shows the species to be too near *B. bicolor* to be regarded as distinct.

BOLETUS RUSSELLII Frost.

This handsome species is represented by three excellent large plants and five specimens only fairly well preserved. They were collected in moist woods in 1862. (PLATE 40.)

BOLETUS SALMONICOLOR Frost.

Represented by twelve poor specimens collected in the borders of pine woods. This species is apparently synonymous with *B. luteus*.

BOLETUS SATANUS Lenz.

This name appears in an annotated copy of the Amherst Catalogue in Frost's library. It is represented by three sheets, containing seven fair and three poor specimens, none of them distinct from *B. luridus*.

BOLETUS SCABER Bull.

This exceedingly common species is represented by a sheet containing two good plants, and another containing four very poor specimens which are both moulded and eaten by insects. Some of the specimens under *B. versipellis* also probably belong here.

BOLETUS SEROTINUS Frost.

Represented by two sheets containing ten plants rather poorly preserved, collected in 1862 on shady grassy ground late in autumn. The description, habitat, and late habit, as well as the types themselves, point to *B. Clintonianus*, from which this species can hardly be distinct.

BOLETUS SISTOTREMA Fries.

The single specimen bearing this name is so very poor that it suggests no comment. Frost evidently thought he had what Peck listed under this name in the 23d Report, which proved to be a form of *B. piperatus* with large unequal tubes near the stem.

BOLETUS SORDIDUS Frost.

Represented by four rather good plants collected on recently excavated earth in woods in midsummer.

BOLETUS SPADICEUS Schaeff.

Represented by a dozen fair to good specimens, all of which agree well with *B. subtomentosus*. *B. spadiceus* probably does not occur in America.

BOLETUS SPECIOSUS Frost.

This handsome species is well represented by two fine plants cut in half and excellently preserved. Even the color and surface characters of the stem are well shown.

BOLETUS SPRAGUEI Frost.

Represented by two sheets, containing three mature specimens and a cluster of smaller ones, all well preserved. This species is placed by Professor Peck under his *B. vermiculosus*, which is, in

turn, only a form of *B. luridus*. Even if Frost's species had been distinct, the name could not have been retained on account of *B. Spraguei* B. & C., published two years previously for *B. pictus* Peck.

BOLETUS STROBILACEUS Scop.

This common species is represented by five good plants. Frost later changed the generic name to *Strobilomyces*, in accordance with Berkeley's classification.

BOLETUS SUBTOMENTOSUS L.

Represented by nine rather poor specimens, some of which may be *B. chrysenteron*.

BOLETUS TENUICULUS Frost.

Three poor specimens represent this species, the central one apparently quite distinct from the other two. The description, also, is very brief, leaving the identity of the species in doubt, unless better authentic specimens exist elsewhere.

BOLETUS UNICOLOR Frost.

This species was published by Peck in 1889 from manuscript only. Frost's collection contains a single sheet with five poor plants, which add little to the description.

BOLETUS VERSIPELLIS Fries.

Represented by six good plants and four that are only fair. They may be only a reddish brown form of *B. scaber*.

BOLETUS VIRIDARIUS Frost.

This species, not distinct from *B. Clintonianus*, was collected on grass plats in October and November. It is represented by a sheet with seven poor specimens and a piece of cardboard containing six good ones.

BOLETUS VISCOSUS Frost.

The collection contains twenty-one plants, all rather poor, collected in pine or fir woods in autumn. They are all alike, with very short stem, well deserving the name *B. brevipes*, assigned them by Peck in the 38th Report, although probably only a form of *B. granulatus*. The name *B. viscosus* was untenable, having already been used by Venturi.

UNPUBLISHED SPECIES

BOLETUS AUREOBRUNNEUS Frost.

Two sheets, with three good specimens, represent this species, which is synonymous with *B. ornatipes* Peck.

BOLETUS CANUS Frost.

Represented by two sheets, with three good plants and two poor ones. They are probably *B. edulis.*

BOLETUS DIFFRACTUS Frost.

Represented by two poor plants cut in half and hardly worth studying. It is apparently near *B. bicolor.*

BOLETUS FARLOWI Frost.

Three sheets, containing seven good specimens and two very poor ones, represent this species, which is hardly distinct from *B. edulis.*

BOLETUS FLAVO-AUREUS Frost.

Collected in rich woods in August and September, 1867, and represented by five good plants and six that are only fair. On the type sheet is written, "*B. affinis* Peck by first publication."

BOLETUS GLUTINIPES Frost.

Represented by three good plants collected in moist woods in 1863. On the sheet is a good description, and the words, "*aurisporus* Peck by first publication."

BOLETUS GRAMINICOLA Frost.

Three good specimens, collected on grassy ground in October, represent this species, which can hardly be distinct from *B. Clintonianus.* The specific name first selected by Frost was "*graminis,*" which was not in good form, and he soon changed it to "*graminicola*".

BOLETUS INTERRUPTUS Frost.

The collection contains three very poor plants of this species, which would hardly repay study, especially as I find no description

BOLETUS LENTICULARIS Frost.

Represented by fifteen good plants, collected during September and October on excavated earth in woods, accompanied by a full description. I see no distinction between this species and *B. subtomentosus.*

BOLETUS MURRAII Frost.

Represented by three sheets, containing five good plants and one poor one, all of which Frost refers to "*B. pictus* Peck by first publication." The following footnote under *B. pictus* in his Catalogue of Boleti explains the change of name:

"This species was discovered several years since by the late Mr. Dennis Murray, of Roxbury, Mass., and named *Boletus Murraii*, B. & C. (C. J. Sprague's MSS.). Under this name I have distributed it. Recently it has been published in the "Grevillea," a London periodical, as *Boletus Spragueii*, B. & C. Mr. Peck, of the New York Botanical Survey, several months before this latter, published it as *Boletus pictus* Peck; therefore his name has the priority."

BOLETUS PALUDOSUS Frost.

Seven good plants and two small poor ones, all collected in marshy woods, represent this species. Both the specimens and the description point to *B. chrysenteron*, from which it can hardly be distinct.

BOLETUS RUBRIPES Frost.

Two sheets containing four fair to poor specimens collected in pine woods are to be found in the collection. The poor specimens and brief description hardly warrant a guess as to its identity, although there is a resemblance to *B. Peckii* in some of the specimens.

BOLETUS SUBCHROMEUS Frost.

The sheet bearing this name contains seven excellent plants collected in moist woods late in autumn, accompanied by a full description. On another sheet this name was changed to *B. Ravenelii* B.C., already published for this species.

BOLETUS SUBRETICULATUS Frost.

Only one plant is to be found in the collection and this is glued to the sheet with the surface down, and what remains is badly moulded. The description implies a relationship to *B. chrysenteron* or *B. subtomentosus*.

BOLETUS VINACEUS Frost.

Represented by eight poor moulded plants and a full description. Frost refers them to "*B. gracilis* Peck by first publication."

NEW YORK BOTANICAL GARDEN.

Some North Dakota Hypocreales

FRED J. SEAVER

For some time past the writer has been engaged in the preparation of a monograph of the North American Hypocreales and the year spent in North Dakota, in the employ of the North Dakota Agricultural College, afforded a fair opportunity for the study of the various species of this order in that particular locality. While the work on the local fungi of that state was not limited to the order treated here, an especial effort was made to accumulate as much material of this order as possible. All of the species reported here were collected in the summer and autumn of 1907 and the spring of 1908. Most of the material was collected near Fargo, in the extreme eastern part of the state, but several specimens were obtained at Hawk's Nest, a low range of hills near the central part of the state, the ravines of which are shaded by a considerable growth of forest trees.

North Dakota, being essentially a prairie state and having its timbered regions limited to narrow belts along the rivers, lakes, and ravines in mountainous districts, does not afford the most favorable conditions for the growth of those forms of fungi which thrive best in moist shaded places. But notwithstanding the unfavorable conditions, the season spent in work on the fungus flora of this state was rewarded with a surprisingly large number of the saprophytic forms, while parasitic fungi which occur in more open regions were found to be most abundant.

The order Hypocreales is represented by approximately two hundred species in the whole of North America, and it would not be expected that a large number of species of a single order of this size would be collected in a given locality during one season. The list is published at this time, not on account of the large number collected, but to add to the knowledge of the distribution of this order in North America, and since there is little published work on the fungi of North Dakota, it is hoped the list will be of interest to some.

Of the twenty species reported here one at least deserves especial mention. *Nectria tubercularifórmis* (Rehm) Winter was collected in the autumn of 1907 on herbaceous stems and one specimen was found in full fruit on the bark of a dead branch. No specimen of this species had previously been seen in the collection of North American Hypocreales examined and up to the present time no record of it from North America has been seen. During the spring of 1908 a quantity of the material was collected on dead stems of nettle, on which host the species has been reported in Europe. The species, while a true stromatic *Nectria*, is specifically very distinct from any of the other forms of the genus that have been examined. The stroma is tubercular, very distinct in outline, and rounded or more often elongated. The perithecia are small and instead of being cespitose on the stroma so as to cover it almost completely, as is usually the case, they are entirely superficial and distributed over its surface, being often scattered but occasionally crowded. The species is of interest not only on account of its distribution but for its peculiar specific characters.

The identification of the species recorded here has been facilitated by access to the collections of the New York Botanical Garden, with its numerous types, as well as by the types that have been received from individuals during the course of the work on the order.

Synopsis of the genera

Perithecia free on the substratum, or entirely superficial on a sessile stroma.
- Perithecia dark blue with transmitted light (nearly black to the naked eye), spores with 3 or more septa. — I. GIBBERELLA.
- Perithecia normally bright colored, of some shade of red, yellow, or brown (often becoming dark with age).
  - Spores 2-celled. — II. NECTRIA.
  - Spores muriform. — III. PLEONECTRIA

Perithecia more or less immersed in a common matrix, varying from a cottony subiculum to a distinct fleshy stroma.
- Matrix consisting of a cottony subiculum in which the perithecia are seated, usually growing on other fungi; spores fusiform. — IV. HYPOMYCES.
- Matrix consisting of a distinct fleshy stroma, sessile or erect; spores filiform or subglobose.
  - Asci 16-spored (by the breaking of each spore into two); spores subglobose; stroma sessile (very rarely erect). — V. HYPOCREA.
  - Asci 8-spored; spores filiform, nearly as long as the ascus; stroma erect (very rarely subsessile).

Stroma springing from a sclerotium formed in the ovaries of plants. VI. CLAVICEPS.
Stroma springing from the bodies of dead insects, larvae, or underground fungi. VII. CORDYCEPS.

I. GIBBERELLA

GIBBERELLA PULICARIS (Fries) Sacc. Very common on old corn-stalks about Fargo. This fungus is reported to have as its conidial phase species of *Fusarium*. The mature fruit appears on dead materials and its connection with a *Fusarium* suggests a possibility of its association with plant diseases. The life-history of this plant should be more carefully studied.

II. NECTRIA

a. Perithecia solitary and free on substratum.

NECTRIA PEZIZA (Tode) Fries. This is one of the most common of the non-stromatic forms of *Nectria* and occurs on various kinds of dead materials. It is perhaps most common on decayed wood but is often found on old fungi and one very good specimen was collected in North Dakota on a piece of old burlap sacking. The species is characterized by the rather large nearly globose perithecia which collapse when dried so as to resemble a small *Peziza*, for which the species has often been mistaken. The spores also are characteristic, being broadly elliptical and non-constricted. Various collections were made at Fargo and Hawk's Nest.

NECTRIA EPISPHAERIA (Tode) Fries. On various kinds of sphaeriaceous fungi. The species is distinguished from *Nectria sanguinea* Bolton by its occurrence in this kind of a habitat. The forms occurring on fungi show a strong tendency to collapse from the two opposite sides, which tendency, although less common, is not entirely lacking in young specimens of *Nectria sanguinea* Bolton. It is thought doubtful if the two are specifically distinct. Both are characterized by the blood-red color of the perithecia.

b. Perithecia borne on a stroma, often cespitose.

NECTRIA COCCINEA (Pers.) Fries. Several specimens on dead branches in woods near Fargo. The species is distinguished by the scarlet-red perithecia, borne in clusters on a yellowish stroma.

NECTRIA PURPUREA (L.) Wilson & Seaver.

Nectria cinnabarina (Tode) Fries.

On dead branches of various kinds of trees and shrubs. The mature fruit of this plant occurs on dead branches and usually in great abundance, but its conidial phase is reported to be parasitic. The species is recognized by the rough perithecia, which vary in color from rather bright cinnabar-red to dull brownish black and are borne in dense clusters on a tubercular stroma.

NECTRIA VERRUCOSA (Schwein.) Sacc. On dead branches in woods near Fargo. The perithecia and spores of this species are identical with those of the preceding. The species is distinguished by the fact that the stroma is depressed, never rising above the surface of the bark, while in the preceding it is tubercular and very prominent.

NECTRIA TUBERCULARIFORMIS (Rehm) Winter; Rabenh. Krypt. Flora 1^2: 118, 119. 1887.

Hypocrea tuberculariformis Rehm, Ber. Naturh. Ver. Augsburg **26**: 106. 1881.

Exsicc.: Rehm, Ascom. *435*, *679*.

Other specimens examined: N. Dakota, *Seaver*, various collections.

Habitat: Herbaceous stems (especially *Urtica* sp.), bark, and dung.

Stroma tubercular, rounded or more usually elongated, nearly smooth or in dried specimens often longitudinally striated, pinkish or rose-colored, becoming dull red with age.

Perithecia superficial, solitary or more or less crowded, small, averaging about 200 μ in diameter, smooth or nearly so, globose with a rather prominent ostiolum, delicately rose-colored, becoming slightly collapsed from above when dry; asci clavate, 8-spored, about 40–50 μ × 6–7 μ; spores 1- or 2-seriate, mostly 2-seriate above and 1-seriate below, usually a little broader above, fusoid, and a little constricted at the septum, with two or more small oil-drops in each cell, 8–11 μ × 3–4 μ.

The conidial phase is often very abundant but the mature fruit is less common.

III. PLEONECTRIA

PLEONECTRIA BEROLINENSIS Sacc. On dead branches of red currant in the Agricultural College Gardens and also on branches

of wild black currant in woods near Fargo. Very destructive to currants in cultivation. In external appearance the plants of this species very closely resemble those of *Nectria purpurea* (L.) W. & S. but the species is very distinct in the spore characters. The spores instead of being 2-celled are divided both longitudinally and transversely into numerous cells.

IV. HYPOMYCES

HYPOMYCES AURANTIUS (Pers.) Fuckel. On decaying fungi of various kinds. Various collections, Fargo and Hawk's Nest. The fungus presents to the naked eye a rusty red appearance due to the cottony stroma, which spreads over the substratum often for several inches. Closer examination will show the orange-colored perithecia scattered over the stroma. The species is rather common.

HYPOMYCES LACTIFLUORUM (Schwein.) Tul.

Hypomyces purpureus Peck.

On some agaric in woods near Fargo. The stroma of this plant, which entirely covers the hymenium of the host infected, presents an orange-yellow color. Scattered over the orange surface are the perithecia, which are nearly immersed, with necks protruding. As the plants of the host decay, they become purple, which accounts for the specific name of the synonym given above. The species was found to be abundant in one locality.

HYPOMYCES OCHRACEUS (Pers.) Tul. On some agaric in same locality as preceding. The plants differ from the preceding by the fact that the stroma is almost entirely white when fresh, becoming yellowish as it dries. There is also a marked difference in the spores.

HYPOMYCES POLYPORINUS Peck. On old plants of *Coriolus versicolor*, in woods near Fargo. The plants of this species occur on the under surface of the host and would scarcely be seen except by accident or special search. Characterized by the amber color of the perithecia and the habitat as well as by spore characters. Found in considerable abundance. I am indebted to Professor C. H. Peck for an authentic specimen of this species for comparison.

HYPOMYCES ROSELLUS (Albert. & Schwein.) Tul. Several collections on the under side of rotten logs in woods near Fargo.

The species is well marked by the delicate rose color of the subiculum and perithecia as well as by spore characters.

V. HYPOCREA

HYPOCREA CITRINA (Pers.) Fries. On dead limbs of basswood, especially where the outer bark has been removed. Plants form a bright lemon-yellow stroma, often several inches in extent on the substratum. The perithecia are seen as little dots over the surface of the stroma. The plants resemble those of the preceding genus but are readily distinguished by the spore characters. Considerable quantity of this material has been collected but always on the same host.

HYPOCREA PATELLA Peck. The stroma in this species is very small as compared with the preceding and not so bright-colored. In the specimens of this species collected, it seems to show a tendency to grow on old sphaeriaceous fungi. This has been compared with specimens identified by Professor Peck.

HYPOCREA RICHARDSONI Berk. & Mont. Very common on limbs of *Populus tremuloides* in woods near Fargo. No perithecia have been seen in any of the specimens which have been examined. Although in external appearance the plants resemble a *Hypocrea*, it is doubtful if they rightfully belong to this genus.

HYPOCREA RUFA (Pers.) Fries. The specimens which were collected in Fargo were small and not fair examples of this species, but they seem to belong here.

VI. CORDYCEPS

CORDYCEPS MILITARIS (L.) Link.

Isaria farinosa Fries.

On larvae of insects in Fargo woods. Only the conidial phase of this plant was collected in North Dakota but that occurred in considerable abundance and doubtless the mature fruit would have appeared at the proper season. The conidial phase is characterized by the snow-white feather-like growth, with its yellowish stem which springs from larvae that are buried under leaves and soil.

CORDYCEPS PISTILLARIAEFORMIS Berk. & Broome. On scale-insects on branches of *Xanthoxylum americanum* in woods about Fargo. The plants of this species collected do not show mature

asci and spores but otherwise correspond well with other specimens of this species that have been examined.

VII. CLAVICEPS

CLAVICEPS PURPUREA (Fries) Tul. The species was collected by the writer on several hosts including *Bromus*, *Agropyron*, and cultivated rye, in the Agricultural College grounds. The fungus is a parasite and besides causing some reduction in the crop is also the cause of a characteristic disease among cattle. It is used as an official drug under the name of ergot.

NEW YORK BOTANICAL GARDEN.

Notes on Rosaceae—I

Per Axel Rydberg

The author has thought it advisable to publish a series of notes on this family, supplementary to his monograph in the North American Flora, vol. 22, beginning on page 239. The reasons for so doing, are :

1. The plan of the North American Flora does not allow many critical notes and explanations, and many facts worthy of presentation must necessarily be omitted on account of lack of space.

2. It is not always evident from the synonymy alone, why a certain name should be adopted in preference to another.

3. It is often desirable to present the author's reasons for his limitation of genera and species.

4. In the North American Flora, only the types of new species are given. It is often desirable to cite some more specimens, which would help in identification of these species, when the types are not accessible.

Opulaster Medic.

There may be some doubt as to whether this genus was properly published. The original publication consists only of citing *Spiraea opulifolia* L. as a synonym of *Opulaster bullatus* Medic. *Icotorus* Raf., *Epicostorus* Raf., and *Physocarpa* Raf., were published in about the same way. The only name for the genus, which was accompanied by an adequate description, was *Physocarpus* Maxim. ; but this, as well as *Physocarpa* Raf., is invalidated by the older *Physocarpon* Necker,* and *Physocarpum* Bercht. & Presl,† which both have Latin diagnoses. Under the latter, there are also two species named and described. There is, therefore, no alternative left but the retaining of *Opulaster* as the name of the genus, unless the making of a new name is preferred.

* Elem. Bot. 2 : 164. 1790.

† Rostl. 1 : Ranunc. 14. 1823.

In the North American Flora, thirteen species of *Opulaster* are admitted. Of these, nine are previously known species, while four are proposed as new. Of the more recently described species, *Physocarpus michiganensis* Daniels, and *P. missouriensis* Daniels, were placed as synonyms under *O. opulifolius* and *O. intermedius*, respectively. The only distinctive character given by Daniels is the pubescence, which is said to consist of stellate hairs in his two new species; while the two older species should have glabrous leaves or pubescent ones with simple hairs. In none of the species of this genus are the hairs normally simple; only occasionally simple hairs are found. While in *O. opulifolius* the leaves are usually glabrous or nearly so, they are in *O. intermedius* usually quite pubescent, and the hairs commonly branched. If the amount of pubescence should be regarded as a distinctive specific character in *Opulaster*, then *Spiraea ribifolia* Nutt., or *Neillia opulifolia multiflora* Durand, should be regarded as a distinct species from *O. capitatus*, and *O. pubescens* Rydb. from *O. malvaceus* (Greene) Kuntze.

Spiraea ribifolia Nutt., the more glabrate form of *O. capitatus*, has often been confused with *O. opulifolius*, and it is this form that has caused the error of including the Pacific coast in the range of *O. opulifolius*, which is confined to the Alleghanian region. The amount of pubescence is indeed of very little value, and the only reliable characters by which to distinguish the eastern species from its western ally are the long caruncle in the former and the different shapes of the leaves, especially those of the sterile shoots.

As stated above, *O. pubescens* Rydb. is reduced to a synonym of *O. malvaceus*. *O. Ramaleyi* A. Nelson is made a synonym of *O. intermedius*, while in my Flora of Colorado it was regarded as the same as *O. bracteatus* Rydb. The first specimen cited by Nelson belongs to *O. bracteatus*, but it does not agree with the description of the carpels. All the other specimens cited agree with said description, and these belong to *O. intermedius*. *O. Ramaleyi* should therefore be regarded as the same as that species.

The four new species described are: *O. australis*, related to *O. opulifolius* and *O. capitatus*; *O. cordatus*, related to *O. intermedius*; *O. alabamensis*, related to *O. stellatus*; and *O. Hapemanii*, related to *O. monogynus*.

O. australis resembles a small *O. opulifolius*, but it has the short caruncle of the western *O. capitatus*. Its carpels are only about half the size of those of either of the two species mentioned. *Spiraea caroliniana*, mentioned in Marshall's Arbustum, may belong here, but that species was evidently never published. To *O. australis* belong, beside the type given, the following specimens:

North Carolina: Craggy Mountain, July 8 and Sept. 8, 1897, *Biltmore Herbarium 1282 b.*

Virginia: Summit, Stony Man Mountain, Aug. 13, 1901, *E. S. & Mrs. Steele 170;* Peaks of Otter, June 6, 1890, *A. Brown, T. Hogg, &c.*

In the herbarium of the New York Botanical Garden there is a specimen, received from the herbarium of P. V. LeRoy, and according to the label collected in Mexico by Vischer, in 1838. This has even smaller flowers than *O. australis*. As *Opulaster* is otherwise unknown from Mexico, there was probably a mistake in labeling or a misplacement of labels, and the specimen probably came from some other place. This specimen was therefore ignored when the manuscript for the North American Flora was prepared.

O. cordatus is most closely related to *O. intermedius*, but the two species differ in the form of the leaves and the ranges of the two are widely separated. Besides those of the type collection, given in the Flora, only the following specimens may be doubtfully referred to it:

California: Portola, July, 1903, *Elmer 4804.*

O. alabamensis is somewhat intermediate between *O. stellatus* and *O. intermedius*, but differs from both in the shape of the leaves, especially those of the sterile shoots. To *O. alabamensis* belong the following specimens:

Alabama: Auburn, Sept., 1900, *Lloyd & Earle;* April 17, 1897, *Earle & Baker;* July 11, 1896, *Earle & Underwood.*

South Carolina: Sandy river bottom, Clemson College, May 20, 1906, *H. D. House 2175;* Six Miles Creek, May 19, 1907, *3383.*

O. Hapemanii might be a hairy form of *O. monogynus*, just as *O. opulifolius*, *O. intermedius*, *O. capitatus*, and *O. malvaceus* have strongly pubescent and almost glabrous forms. *O. Hapemanii* is, however, so unlike *O. monogynus* in habit that it was thought ad-

visable to give it a distinct name. In many respects it resembles strongly *O. alternans*, and the author has entertained the thought that it might be a 2-carpellary form of that species. The styles in *O. Hapemanii* are, however, more or less spreading, while in *O. alternans* the style is erect, showing that the latter is related to *O. malvaceus*. Besides the type, the following specimens may be referred to *O. Hapemanii:*

Wyoming: Hartville, July 20, 1894, *Aven Nelson 498.*

The following specimens are referred to *O. alternans:*

Utah: Provo, Wahsatch Mountains, June 16, 1902, *Goodding 1159;* Stansbury's Island, June 26, 1850, *Stansbury.*

Nevada: East Humboldt Mountains, *S. Watson.*

Mr. A. A. Heller adopted the name *O. pauciflorus* for *O. malvaceus.* It is true that the original specimens of *Spiraea pauciflora* Nutt. belong to this species; but *S. pauciflora* was never properly published, only mentioned as a synonym under *S. opulifolia pauciflora* in Torrey and Gray's Flora. This variety was, however, primarily based on *S. monogyna* Torr., and hence belongs rather to *O. monogynus.*

SPIRAEA

Spiraea parvifolia Benth. is a very strange and interesting species. Maximowicz referred it to the section (now the genus) *Petrophytum.* It is, however, a true *Spiraea,* notwithstanding the racemose inflorescence and the entire leaves. Neither has it the depressed habit nor the fruit of *Petrophytum.* As far as is known to me, it has been collected but once. By the courtesy of the director of the Kew Gardens, England, the New York Botanical Garden has received an excellent drawing of the type and some fragments of the plant, enough to show its real character. Unfortunately, *S. parvifolia* Benth. is antedated by *S. parvifolia* Raf. I therefore took pleasure in naming the plant *S. Hartwegiana,* after the discoverer.

The species which appeared in the North American Flora under the name *S. Steveni* has had a peculiar history. The older botanists referred it to *S. chamaedryfolia* L., a species with the flowers in simple corymbs, instead of in flat-topped panicles. Later, it was referred, together with *S. corymbosa, S. lucida, S. splendens,*

and *S. densiflora*, to the Siberian *S. betulifolia*. Dr. E. L. Greene apparently was the first one to point out that the Alaskan species differed from all the other North American relatives in having reflexed sepals. As this is a character found in the original *S. betulifolia* he removed from that species all but the Alaskan plant. The latter, however, differs considerably from Pallas's figure of *S. betulifolia*, and also from Siberian specimens of the same in the Torrey Herbarium. After some search among the literature on the genus, I found that the Alaskan plant had been described by C. K. Schneider. That *S. Steveni* is distinct from *S. betulifolia*, is evident. There may be some doubt, however, whether it is specifically distinct from *S. Beauverdiana* of which Schneider made it a variety. I have seen no specimens of *S. Beauverdiana*, but from the characters given by Schneider, it seems distinct enough.

It is strange that the oldest specific name and publication of the beautiful little shrub of the mountains of California and Oregon, usually known as *S. arbuscula*, should have been overlooked so generally. Only in a single one of the later German works on woody plants is the name mentioned; and still, *S. splendens* Baumann was amply published.

To *S. Helleri*, I refer, besides the type, the following specimens:

California: Summit, Central Pacific Railroad, July, 1877, *H. Edwards.*

S. japonica is occasionally found escaped from cultivation. I have seen the following specimens:

Pennsylvania: Point Pleasant, July 11, 1898, *C. D. Fretz;* Liberty, September 1, 1906, *J. K. Small.*

S. salicifolia is not found native on this continent. What has gone under that name, is partly *S. latifolia*, and partly *S. alba*. The former is distinguished by its broad, obovate or oblanceolate leaves and almost glabrous inflorescence. When the flowers first open, they are usually more or less pinkish; but in age they become white. Even in "Gray's New Manual," *S. alba* is described as *S. salicifolia*. The two resemble each other in the narrower leaves and the pubescent inflorescence, but differ in the flowers, which in *S. alba* are white instead of deep pink, and in the leaves, which are broader above instead of below or at the middle.

In Canada and northern New England and New York there

is a form of *S. latifolia*, growing in rocky places, especially along streams, with short broad leaves, rounded at the apex and coarsely toothed. It is also much lower than the ordinary *S. latifolia*, and the stems usually die back each year to near the base. This was described as *S. obovata* by Rafinesque. Usually it is very unlike the ordinary *S. latifolia*, but intermediate forms are not infrequent. This form needs more field study.

In the North America Flora, there are five new species proposed. These, together with *S. pyramidata*, the author is inclined to regard as hybrids, except *S. Helleri*. Hybrids are not uncommon in the genus *Spiraea*. *S. Nobleana* was described by J. D. Hooker from a plant raised in a California nursery. It is supposed to be a hybrid between *S. Douglasii* and *S. salicifolia*. As one of the supposed parents is a native of North America and the other is occasionally found spontaneously, and as the plant originated in America apparently without the help of man, it might have been included in the North American Flora, but it was excluded therefrom, like all other garden plants. The native species of probable hybrid origin and their probable parents are as follows:

S. roseata = *S. Menziesii* × *densiflora*.
S. subvillosa = *S. Douglasii* × *densiflora*.
S. tomentulosa = *S. Douglasii* × *lucida*.
S. pyramidata = *S. Menziesii* × *lucida*.
S. subcanescens = *S. tomentosa* × *alba*.

Spiraea tomentulosa, and *S. subcanescens* are known only from the type locality. *S. subvillosa* has been collected also at the following station:

Oregon: Hood River, Cascade Mountains, Aug. 1, 1894, *F. E. Lloyd*.

S. roseata has been collected at the following locality:

Idaho: Near Cooper's, July 20, 1892, *Isabel Mulford*.

PETROPHYTUM AND KELSEYA

It is gratifying to the author, that C. K. Schneider,* a rather conservative dendrologist, has independently raised these to generic rank. The genera are related to *Spiraea*, but are distinguished by the peculiar habit and by the structure of their fruits. To

* Handb. Laubh. 1: 484, 485. 1905.

merge them into *Eriogynia*, or *Luetkea*, as was done by S. Watson, O. Kuntze, and E. L. Greene, is rather indefensible; and it is strange that A. A. Heller, who recognized *Petrophytum caespitosum* and *P. elatior* as representing a distinct genus, should transfer the closely related *Spiraea cinerascens* to *Luetkea*. In the Flora are recognized five species of *Petrophytum*. Of these one, viz., *P. acuminatum*, is proposed as new. It is known only from the type locality. *Kelseya* is monotypic.

LUETKEA

It is doubtful which of the two names, *Luetka* or *Eriogynia*, is the older. Otto Kuntze, when adopting *Luetkea* instead of *Eriogynia*, claimed that the former was published in 1831 and the latter in 1833. It is most probable that they were both published in 1832. The part of the Memoirs of the Academy of St. Petersburg in which Bongard's paper on the vegetation of Sitka was published, appeared in August, 1832. Whether any separates were distributed before that time we can not ascertain. *Eriogynia* was published in 1832, apparently in the later part of the year, but the exact date is unknown. For that reason I did not change the now accepted name of the genus.

The generic name was originally spelled *Lütkea*. As the German *ü* is not found in Latin, it is usually replaced by *ue*. *Luetkea* is therefore preferable to *Lutkea*.

ARUNCUS

The plants of this genus native to the eastern United States have invariably much smaller fruit than the European plants. The plant common in the Alleghanies has thinner, more glossy leaves and rather thick fruit. It is *Aruncus sylvestris americanus* of Maximovicz, but unfortunately the synonym, *Spiraea Aruncus americana* Pers., from which Maximovicz adopted the name, is very doubtful. It may belong, as well as all the synonyms under *A. alleghanensis*, except the last, to *Astilbe* instead of *Aruncus*. Hence a new name was proposed.

The *Aruncus* of the Mississippi valley has rather thick, densely pubescent leaves and more slender fruit. It was described under the name of *A. pubescens*.

The plant of northwestern North America is much closer to the European *Aruncus Aruncus*, and differs practically only in the long-acuminate leaflets. If any of the American species of *Aruncus* should be reduced to the Old World species, it should be *A. acuminatus*. *A. Aruncus* is common in cultivation and rarely escaped.

To these four species is to be added an East Siberian species *A. kamchaticus*, which has been collected on *Attu*, the most westerly of the Aleutian Islands.

NEW YORK BOTANICAL GARDEN.

Studies in North American Peronosporales — IV. Host index

GUY WEST WILSON

The present host index of the North American species of the order Peronosporales has been prepared with a view of bringing together in a convenient form for reference all the published hosts of these fungi. The list has been made as complete as possible and such cross-references as will facilitate its use are given, while care has been taken not to overburden the index with useless synonyms. No new hosts are recorded in this index and no attempt is made to unravel tangles of synonymy or specific limitations, but the index represents as completely as possible our present knowledge of the host distribution of the commonly recognized American species of the order.

AIZOACEAE

TRIANTHEMA PORTULACASTRUM L.
Albugo Trianthemae G. W. Wilson.

ALLIACEAE

ALLIUM CEPA L.
Peronospora Schleideni Unger.

ALSINACEAE

CERASTIUM CERASTIOIDES (L.) Britton.
Peronospora Alsinearum Caspary.

CERASTIUM LONGIPEDUNCULATUM Muhl.
Peronospora Alsinearum Caspary.

CERASTIUM NUTANS Raf.; see *C. longipedunculatum* Muhl.

CERASTIUM TRIGYNUM Vill.; see *C. cerastioides* (L.) Britton.

CERASTIUM VISCOSUM L.
Peronospora Alsinearum Caspary.

CERASTIUM VULGATUM L.
Peronospora Alsinearum Caspary.

CERASTIUM sp.
Peronospora Alsinearum Caspary.

SILENE ANTIRRHINA L.
Peronospora Arenariae macrospora Farl.

SILENE sp.
Peronospora Arenariae macrospora Farl.

SPERGULA ARVENSIS L.
Peronospora Alsinearum Caspary.

TISSA LEUCANTHA (Robins.) Greene.
Albugo Lepigoni (de Bary) Kuntze.

TISSA MARINA (L.) Britton.
Albugo Lepigoni (de Bary) Kuntze.

ALLIONIACEAE

ALLIONIA INCARNATA L.; see *Wedelia incarnata* (L.) Kuntze.

ALLIONIA NYCTAGINEA Michx.
Peronospora Oxybaphi E. & E.

BOERHAAVIA ANISOPHYLLA A. Gray.
Albugo platensis (Speg.) Swingle.

BOERHAAVIA DIFFUSA L.
Albugo platensis (Speg.) Swingle.

BOERHAAVIA ERECTA L.
Albugo platensis (Speg.) Swingle.

BOERHAAVIA HIRSUTA Willd.
Albugo platensis (Speg.) Swingle.

BOERHAAVIA PANICULATA Rich.
Albugo platensis (Speg.) Swingle.

BOERHAAVIA SONORAE Rose.
Albugo platensis (Speg.) Swingle.

BOERHAAVIA SPICATA Choisy.
Albugo platensis (Speg.) Swingle.

BOERHAAVIA VISCOSA Lag. & Rodr.
Albugo platensis (Speg.) Swingle.

BOERHAAVIA XANTI S. Wats.
Albugo platensis (Speg.) Swingle.

OXYBAPHUS NYCTAGINEUS Sweet; see *Allionia nyctaginea* Michx.

WEDELIA INCARNATA (L.) Kuntze.
Albugo platensis (Speg.) Swingle.

AMARANTHACEAE

ACNIDA CANNABINA L.
Albugo Bliti (Biv.) Kuntze.

ACNIDA TAMARISCINA (Nutt.) Willd.
Albugo Bliti (Biv.) Kuntze.

ACNIDA TAMARISCINA TUBERCULATA (Moq.) Uline & Bray.
Albugo Bliti (Biv.) Kuntze.

ACNIDA TUBERCULATA Moq.; see *A. tamariscina tuberculata* (Moq.) Uline & Bray.

AMARANTHUS ALBUS L.; see *A. graecizans* L.

AMARANTHUS BIGELOVII Uline & Bray.
Albugo Bliti (Biv.) Kuntze.

AMARANTHUS BLITOIDES S. Wats.
Albugo Bliti (Biv.) Kuntze.

AMARANTHUS CHLOROSTACHYS L.; see *A. hybridus* L.

AMARANTHUS CRISPUS (Lesp. & Thev.) Braun.
Albugo Bliti (Biv.) Kuntze.

AMARANTHUS EMARGINATUS Salzm.
Albugo Bliti (Biv.) Kuntze.

AMARANTHUS GRAECIZANS L.
Albugo Bliti (Biv.) Kuntze.

AMARANTHUS HYBRIDUS L.
Albugo Bliti (Biv.) Kuntze.

AMARANTHUS HYBRIDUS PANICULATUS (L.) Uline & Bray.
Albugo Bliti (Biv.) Kuntze.

AMARANTHUS PALMERI S. Wats.
Albugo Bliti (Biv.) Kuntze.

AMARANTHUS PANICULATUS L.; see A. *hybridus paniculatus* (L.) Uline & Bray.

AMARANTHUS RETROFLEXUS L.
Albugo Bliti (Biv.) Kuntze.

AMARANTHUS SPINOSUS L.
Albugo Bliti (Biv.) Kuntze.

AMARANTHUS TRISTIS L.
Albugo Bliti (Biv.) Kuntze.

AMARANTHUS VIRIDIS L.
Albugo Bliti (Biv.) Kuntze.

AMARANTHUS sp.
Albugo Bliti (Biv.) Kuntze.

CLADOTHRIX LANUGINOSA (Moq.) Nuttall.
Albugo Froelichiae G. W. Wilson.

"CYATHULA LAPPULACEA."
Albugo Bliti (Biv.) Kuntze.

FROELICHIA CAMPESTRIS Small.
Albugo Froelichiae G. W. Wilson.

FROELICHIA FLORIDANA (Nutt.) Moq.; see *F. campestris* Small.

FROELICHIA GRACILIS Moq.
Albugo Froelichiae G. W. Wilson.

AMBROSIACEAE

AMBROSIA ARTEMISIAEFOLIA L.
Albugo Tragopogonis (DC.) S. F. Gray.
Rhysotheca Halstedii (Farl.) G. W. Wilson.

AMBROSIA PSILOSTACHYA DC.
Albugo Tragopogonis (DC.) S. F. Gray.
Rhysotheca Halstedii (Farl.) G. W. Wilson.

AMBROSIA TRIFIDA L.
Albugo Tragopogonis (DC.) S. F. Gray.
Rhysotheca Halstedii (Farl.) G. W. Wilson.

AMBROSIA sp.
Albugo Tragopogonis (DC.) S. F. Gray.

FRANSERIA DISCOLOR Nutt.; see *Gaertneria discolor* (Nutt.) Kuntze.

FRANSERIA TENUIFOLIA A. Gray; see *Iva ambrosiaefolia* A. Gray.

GAERTNERIA ACANTHOCARPA (Hook.) Britton.
Albugo Tragopogonis (DC.) S. F. Gray.

GAERTNERIA DISCOLOR (Nutt.) Kuntze.
Albugo Tragopogonis (DC.) S. F. Gray.

IVA AMBROSIAEFOLIA A. Gray.
Albugo Tragopogonis (DC.) S. F. Gray.

IVA CILIATA Willd.
Albugo Tragopogonis (DC.) S. F. Gray.

IVA XANTHIIFOLIA Nutt.
Basidiophora Kellermanii (E. & H.) G. W. Wilson.
Rhysotheca Halstedii (Farl.) G. W. Wilson.

XANTHIUM CANADENSE Mill.
Rhysotheca Halstedii (Farl.) G. W. Wilson.

APIACEAE

"UMBELLIFERAE" gen. et sp. ignot.
Rhysotheca Umbelliferarum (Caspary) G. W. Wilson.

ARACEAE

CALADIUM COLOCASIA (L.) W. F. Wight.
Peronospora trichomata Massee.

COLOCASIA ANTIQUORUM Schott; see *Caladium Colocasia* (L.) W. F. Wight.

ASCLEPIADACEAE

GONOLOBUS MACROPHYLLUS Michx.; see *Vincetoxicum gonocarpos* Walt.

GONOLOBUS SUBEROSUS (L.) R. Br.; see *Vincetoxicum suberosum* (L.) Britton.

GONOLOBUS sp.; see *Vincetoxicum hirsutum* (Michx.) Britton.

VINCETOXICUM GONOCARPOS Walt.
Rhysotheca Gonolobi (Lagerh.) G. W. Wilson.

VINCETOXICUM HIRSUTUM (Michx.) Britton.
Rhysotheca Gonolobi (Lagerh.) G. W. Wilson.

VINCETOXICUM SUBEROSUM (L.) Britton.
Rhysotheca Gonolobi (Lagerh.) G. W. Wilson.

VINCETOXICUM sp.; see *V. hirsutum* (Michx.) Britton.

BALSAMINACEAE

IMPATIENS AUREA Muhl.
Rhysotheca obducens (Schröt.) G. W. Wilson.

IMPATIENS BIFLORA Walt.
Rhysotheca obducens (Schröt.) G. W. Wilson.

IMPATIENS FULVA Nutt.; see *I. biflora* Walt.

IMPATIENS PALLIDA Nutt.; see *I. aurea* Muhl.

IMPATIENS sp.
Rhysotheca obducens (Schröt.) G. W. Wilson.

BORAGINACEAE

CYNOGLOSSUM OFFICINALE L.
Peronospora Cynoglossi Burrill.

ECHINOSPERMUM REDOWSKII CUPULATUM A. Gray; see *Lappula cupulata* (A. Gray) Rydb.

ECHINOSPERMUM REDOWSKII OCCIDENTALE S. Wats.; see *Lappula occidentalis* (S. Wats.) Greene.

LAPPULA CUPULATA (A. Gray) Rydb.
Peronospora Echinospermi Swingle.

LAPPULA FLORIBUNDA (Lehm.) Greene.
Peronospora Echinospermi Swingle.

LAPPULA OCCIDENTALIS (S. Wats.) Greene.
Peronospora Echinospermi Swingle.

LAPPULA TEXANA (Scheele) Britton.
Peronospora Echinospermi Swingle.

MYOSOTIS VERNA Nutt.
Peronospora Myosotidis de Bary.

BRASSICACEAE

ARABIS FURCATA S. Wats.
Albugo candida (Pers.) Rouss.

ARABIS GLABRA (L.) Bernh.
Albugo candida (Pers.) Rouss.

ARABIS HIRSUTA Scop.
Peronospora parasitica (Pers.) de Bary.

ARABIS HOLBOELLII Hornem.
Peronospora parasitica (Pers.) de Bary.

ARABIS LYRATA L.
Albugo candida (Pers.) Rouss.

ARABIS VIRGINICA (L.) Trel.
Albugo candida (Pers.) Rouss.

ARABIS sp.
Peronospora parasitica (Pers.) de Bary.

BARBAREA BARBAREA (L.) McM.
Albugo candida (Pers.) Rouss.

BARBAREA VULGARIS R. Br.; see *B. Barbarea* (L.) McM.

BRASSICA ALBA (L.) Boiss.; see *Sinapis alba* L.

BRASSICA ARVENSIS (L.) B.S.P.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.

BRASSICA CAMPESTRIS L.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.

BRASSICA INTEGRIFOLIA (West) O. E. Schultz.
Albugo candida (Pers.) Rouss.

BRASSICA NIGRA (L.) Koch.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.

BRASSICA OLERACEA L.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.

BRASSICA SATIVA; see *B. oleracea* L.

BRASSICA SINAPISTRUM Boiss.; see *B. arvensis* (L.) B.S.P.

BRASSICA sp.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.

BURSA BURSA-PASTORIS (L.) Britton.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.

CAKILE AMERICANA Nutt.; see *C. edentula* (Bigel.) Hook.

CAKILE EDENTULA (Bigel.) Hook.
Albugo candida (Pers.) Rouss.

CAMELINA MICROCARPA Andrz.
Albugo candida (Pers.) Rouss.

CAMELINA SATIVA (L.) Crantz; see *C. microcarpa* Andrz.

CAPSELLA BURSA-PASTORIS (L.) Moench.; see *Bursa Bursa-pastoris* (L.) Britton.

CARDAMINE BULBOSA (Schreb.) B.S.P.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.

CARDAMINE HIRSUTA (L.).
Peronospora parasitica (Pers.) de Bary.

CARDAMINE LACINIATA Wood; see *Dentaria laciniata* Muhl.

CARDAMINE LUDOVICIANA Hook.; see *Arabis virginica* (L.) Trel.

CARDAMINE RHOMBOIDEA DC.; see *C. bulbosa* (Schreb.) B.S.P.

CHEIRANTHUS ASPER Nutt.
Albugo candida (Pers.) Rouss.

CHEIRANTHUS CHEIRI L.
Albugo candida (Pers.) Rouss.

CHEIRANTHUS PACIFICUM Sheldon.
Albugo candida (Pers.) Rouss.

COCHLEARIA ARMORACIA L.; see *Roripa Armoracia* (L.) A. S. Hitchcock.

COCHLEARIA OLERACEA; see *Roripa Armoracia* (L.) A. S. Hitchcock.

CORONOPUS sp.
Albugo candida (Pers.) Rouss.

DENTARIA DIPHYLLA Michx.
Albugo candida (Pers.) Rouss.

DENTARIA HETEROPHYLLA Nutt.
Peronospora parasitica (Pers.) de Bary.

DENTARIA LACINIATA Muhl.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.

DENTARIA MAXIMA Nutt.
Peronospora parasitica (Pers.) de Bary.

DENTARIA sp.
Peronospora parasitica (Pers.) de Bary.
DRABA CAROLINIANA Walt.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
HESPERIS MATRONALIS L.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
IODANTHUS PINNATIFIDUS (Michx.) Steud.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
KONIGA MARITIMA (L.) R. Br.
Peronospora parasitica (Pers.) de Bary.
LEPIDIUM CAMPESTRE (L.) R. Br.
Albugo candida (Pers.) Rouss.
LEPIDIUM DENSIFLORUM Schrad.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
LEPIDIUM INCISUM; error for *Sisymbrium incisum* Engelm.
LEPIDIUM INTERMEDIUM A. Gray; see *L. densiflorum* Schrad.
LEPIDIUM SATIVUM L.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
LEPIDIUM VIRGINICUM L.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
LEPIDIUM sp.
Peronospora parasitica (Pers.) de Bary.
(See also *L. virginicum* L.)
NASTURTIUM; see *Roripa.*
NESLIA PANICULATA Desv.
Albugo candida (Pers.) Rouss.
RAPHANUS SATIVUS L.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
RORIPA ARMORACIA (L.) A. S. Hitchcock.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
RORIPA HISPIDA (Desv.) Britton.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
RORIPA OBTUSA (Nutt.) Britton.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
RORIPA PALUSTRIS (DC.) Bessey.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
RORIPA SESSILIFLORA (Nutt.) A. S. Hitchcock.
Albugo candida (Pers.) Rouss.
RORIPA SINUATA (Nutt.) A. S. Hitchcock.
Albugo candida (Pers.) Rouss.
RORIPA WALTERI (Ell.) Mohr.
Albugo candida (Pers.) Rouss.
SCHOENOCRAMBE LINIFOLIUM (Nutt.) Greene.
Albugo candida (Pers.) Rouss.
SINAPIS ALBA L.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
SINAPIS ARVENSIS L.; see *Brassica arvensis* (L.) B.S.P.
SISYMBRIUM CANESCENS Nutt.; see *Sophia pinnata* (Walt.) Britton.
SISYMBRIUM INCISUM Engelm.; see *Sophia incisa* (Engelm.) Greene.
SISYMBRIUM OFFICINALE (L.) Scop.
Albugo candida (Pers.) Rouss.
SISYMBRIUM sp.
Peronospora parasitica (Pers.) de Bary.
SOPHIA HARTWEGIANA (Tourn.) Greene.
Albugo candida (Pers.) Rouss.
SOPHIA INCISA (Engelm.) Greene.
Peronospora parasitica (Pers.) de Bary.
SOPHIA PINNATA (Walt.) Britton.
Albugo candida (Pers.) Rouss.
Peronospora parasitica (Pers.) de Bary.
SOPHIA sp.
Peronospora parasitica (Pers.) de Bary.
THELYPODIUM PINNATIFIDUM S. Wats.; see *Iodanthus pinnatifidus* Steud.
THLASPI GLAUCUM A. Nelson.
Albugo candida (Pers.) Rouss.
THLASPI NUTTALLII Rydb.
Albugo candida (Pers.) Rouss.

CAPRIFOLIACEAE

VIBURNUM ACERIFOLIUM L.
Rhysotheca Viburni (Peck) G. W. Wilson.
VIBURNUM DENTATUM L.
Rhysotheca Viburni (Peck) G. W. Wilson.
VIBURNUM NUDUM L.
Rhysotheca Viburni (Peck) G. W. Wilson.
VIBURNUM OPULUS L.
Rhysotheca Viburni (Peck) G. W. Wilson.
VIBURNUM PUBESCENS (Ait.) Pursh.
Rhysotheca Viburni (Peck) G. W. Wilson.

CARDUACEAE

ANTENNARIA PLANTAGINIFOLIA (L.) Rich.
Albugo Tragopogonis (DC.) S. F. Gray.
ARTEMISIA BIENNIS Willd.
Albugo Tragopogonis (DC.) S. F. Gray.
Peronospora leptosperma de Bary.
ARTEMISIA CANADENSIS Michx.
Albugo Tragopogonis (DC.) S. F. Gray.
ARTEMISIA LUDOVICIANA Nutt.
Peronospora leptosperma de Bary.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
ARTEMISIA sp.
Peronospora leptosperma de Bary.
ASTER NOVAE-ANGLIAE L.
Basidiophora entospora Roze & Cornu.
ASTER OBLONGIFOLIUS Nutt.
Basidiophora entospora Roze & Cornu.

ASTER SAGITTIFOLIUS Willd.
Basidiophora entospora Roze & Cornu.
ASTER sp.
Basidiophora entospora Roze & Cornu.
BIDENS CERNUA L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
BIDENS CHRYSANTHEMOIDES Michx.; see *B. laevis* (L.) B.S.P.
BIDENS COMOSA (A. Gray) Wiegand.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
BIDENS CONNATA Muhl.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
BIDENS CONNATA COMOSA A. Gray; see *B. comosa* (A. Gray) Wiegand.
BIDENS FRONDOSA L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
BIDENS LAEVIS (L.) B.S.P.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
CARDUUS ARVENSIS (L.) Robs.
Albugo Tragopogonis (DC.) S. F. Gray.
CARDUUS LANCEOLATUS L.
Albugo Tragopogonis (DC.) S. F. Gray.
CARDUUS MUTICUS (Michx.) Pers.
Albugo Tragopogonis (DC.) S. F. Gray.
CARDUUS SPINOSISSIMUS Walt.
Albugo Tragopogonis (DC.) S. F. Gray.
CARDUUS UNDULATUS Nutt.
Albugo Tragopogonis (DC.) S. F. Gray.
CENTAUREA sp.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
CIRSIUM ARVENSE (L.) Scop.; see *Carduus arvensis* (L.) Robs.
CNICUS ARVENSIS (L.) Hook.; see *Carduus arvensis* (L.) Robs.
CNICUS HORRIDULUS Pursh; see *Carduus spinosissimus* Walt.
CNICUS LANCEOLATUS Hoffm.; see *Carduus lanceolatus* L.
CNICUS MUTICUS (Michx.) Ell.; see *Carduus muticus* (Michx.) Pers.
CNICUS sp.; see *Carduus muticus* (Michx.) Pers.
ERECHTITES HIERACIFOLIA (L.) Raf.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
ERIGERON ANNUUS (L.) Pers.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
ERIGERON CANADENSIS L.; see *Leptilon canadense* (L.) Britton.
ERIGERON PHILADELPHICUS L.
Basidiophora entospora Roze & Cornu.
ERIGERON RAMOSUS Willd.
Basidiophora entospora Roze & Cornu.
ERIGERON sp.
Basidiophora entospora Roze & Cornu.
EUPATORIUM AGERATOIDES L.f.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
EUPATORIUM PURPUREUM L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
GNAPHALIUM PURPUREUM L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
GNAPHALIUM SPATHULATUM L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
HELIANTHUS ANNUUS L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
HELIANTHUS DIVARICATUS L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
HELIANTHUS DORONICOIDES Lam.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
HELIANTHUS GROSSESERRATUS Martens.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
HELIANTHUS HIRSUTUS Raf.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
HELIANTHUS MAXIMILIANI Schrad.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
HELIANTHUS OCCIDENTALIS Riddell.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
HELIANTHUS SCABERRIMUS Ell.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
HELIANTHUS STRUMOSUS L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
HELIANTHUS TRACHELIIFOLIUS Mill.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
HELIANTHUS TUBEROSUS L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
HELIANTHUS sp.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
(See also *Iva ciliata* Willd.)
LEPTILON CANADENSE (L.) Britton.
Basidiophora entospora Roze & Cornu.
MADIA SATIVA Molina.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
MATRICARIA MATRICARIOIDES (Less.) Porter.
Albugo Tragopogonis (DC.) S. F. Gray.
PARTHENIUM INTEGRIFOLIUM L.
Albugo Tragopogonis (DC.) S. F. Gray.

PARTHENIUM REPENS Eggert.
Albugo Tragopogonis (DC.) S. F. Gray.
RUDBECKIA FULGIDA Ait.
Basidiophora entospora Roze & Cornu.
RUDBECKIA LACINIATA L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
RUDBECKIA TRILOBA L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
SENECIO AUREUS L.
Albugo Tragopogonis (DC.) S. F. Gray.
(See also *Senecio oblanceolatus* Rydb.)
SENECIO AUREUS CROCEUS A. Gray; see *S. cymbalarioides* Nutt.
SENECIO CYMBALARIOIDES Nutt.
Albugo Tragopogonis (DC.) S. F. Gray.
SENECIO HARTIANUS Heller.
Albugo Tragopogonis (DC.) S. F. Gray.
SENECIO LUGENS Rich.
Albugo Tragopogonis (DC.) S. F. Gray.
SENECIO MACDOUGALII Heller.
Albugo Tragopogonis (DC.) S. F. Gray.
SENECIO OBLANCEOLATUS Rydb.
Albugo Tragopogonis (DC.) S. F. Gray.
SENECIO PENINSULARIS Vasey & Rose.
Albugo Tragopogonis (DC.) S. F. Gray.
SENECIO SERRA Hooker.
Albugo Tragopogonis (DC.) S. F. Gray.
SENECIO SERRA INTEGRIFOLIA A. Gray.
Albugo Tragopogonis (DC.) S. F. Gray.
SENECIO VULGARIS L.
Bremia Lactucae Regel.
SENECIO sp.
Albugo Tragopogonis (DC.) S. F. Gray.
SILPHIUM INTEGRIFOLIUM Michx.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
SILPHIUM LACINIATUM L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
SILPHIUM PERFOLIATUM L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
SILPHIUM TEREBINTHINACEUM Jacq.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
SILPHIUM TRIFOLIATUM L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
SOLIDAGO CANADENSIS L.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
SOLIDAGO RIDDELLII Frank.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
SOLIDAGO RIGIDA L.
Basidiophora entospora Roze & Cornu.
SOLIDAGO sp.
Basidiophora entospora Roze & Cornu.
VERNONIA BALDWINII Torr.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
VERNONIA NOVEBORACENSIS (L.) Michx.
Rhysotheca Halstedii (Farl.) G. W. Wilson.
VERBESINA ENCELIOIDES (Cav.) A. Gray.
Rhysotheca Halstedii (Farl.) G. W. Wilson.

CHENOPODIACEAE

ATRIPLEX HASTATA L.
Peronospora effusa Rabenh.
BETA VULGARIS L.
Albugo? occidentalis G. W. Wilson.
BLITUM CAPITATUM L.
Albugo occidentalis G. W. Wilson.
CHENOPODIUM ALBUM L.
Peronospora effusa Rabenh.
CHENOPODIUM ALBUM VIRIDE (L.) Moq.
Peronospora effusa Rabenh.
CHENOPODIUM HYBRIDUM L.
Peronospora effusa Rabenh.
CHENOPODIUM LEPTOPHYLLUM (Moq.) Nutt.
Peronospora effusa Rabenh.
CHENOPODIUM RUBRUM L.
Albugo occidentalis G. W. Wilson.
CHENOPODIUM sp.
Peronospora effusa Rabenh.
SPINACIA OLERACEA L.
Peronospora effusa Rabenh.

CICHORIACEAE

ADOPOGON DANDELION (L.) Kuntze.
Bremia Lactucae Regel.
AGOSERIS sp.
Bremia Lactucae Regel.
CICHORIUM INTYBUS L.
Bremia Lactucae Regel.
KRIGIA DANDELION (L.) Nutt.; see *Adopogon Dandelion* (L.) Kuntze.
LACTUCA ALTISSIMA; error for *Nabalus altissimus*.
LACTUCA CANADENSIS L.
Bremia Lactucae Regel.
LACTUCA HIRSUTA Muhl.
Bremia Lactucae Regel.
LACTUCA INTEGRIFOLIA Bigel.; see *L. sagittifolia* Ell.
LACTUCA LEUCOPHAEA A. Gray; see *L. spicata* (Lam.) A. S. Hitchcock.
LACTUCA LUDOVICIANA (Nutt.) DC.
Bremia Lactucae Regel.
LACTUCA PULCHELLA (Pursh) DC.
Bremia Lactucae Regel.
LACTUCA SAGITTIFOLIA Ell.
Bremia Lactucae Regel.
LACTUCA SATIVA L.
Bremia Lactucae Regel.

LACTUCA SPICATA (Lam.) A. S. Hitchcock.
Bremia Lactucae Regel.

LACTUCA sp.
Bremia Lactucae Regel.

MULGEDIUM LEUCOPHAEUM DC.; see *Lactuca spicata* (Lam.) A. S. Hitchcock.

NABALUS ALBUS (L.) Hook.
Bremia Lactucae Regel.

NABALUS ALTISSIMUS (L.) Hook.
Bremia Lactucae Regel.

PRENANTHES ALTISSIMA L.; see *Nabalus altissimus* (L.) Hook.

SONCHUS ASPER (L.) All.
Bremia Lactucae Regel.

SONCHUS sp.
Bremia Lactucae Regel.

TRAGOPOGON PORRIFOLIUS L.
Albugo Tragopogonis (DC.) S. F. Gray.

CONVOLVULACEAE

BATATAS EDULIS (L.) Choisy; see *Ipomoea Batatas* (L.) Lam.

CALONYCTION ACULEATUM (L.) House.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

CALYSTEGIA SEPIUM (L.) R. Br.; see *Convolvulus Sepium* L.

CONVOLVULUS BATATAS L.; see *Ipomoea Batatas* (L.) Lam.

CONVOLVULUS INCANUS Vahl.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

CONVOLVULUS MACRORRHIZA; see *Ipomoea pandurata* (L.) Meyer.

CONVOLVULUS SEPIUM L.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

CONVOLVULUS sp.; see *Ipomoea hederacea* L.

CONVOLVULACEAE, gen. et sp. ignot.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

IPOMOEA BATATAS (L.) Lam.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

IPOMOEA CAROLINA (L.) Pursh.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

IPOMOEA COMMUTATA R. & S.; see *I. Carolina* Pursh.

IPOMOEA HEDERACEA (L.) Jacq.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

IPOMOEA INCARNATA Vahl.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

IPOMOEA LACUNOSA L.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

IPOMOEA LEPTOPHYLLA Torr.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

IPOMOEA MEXICANA A. Gray.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

IPOMOEA PANDURATA (L.) Meyer.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

IPOMOEA PES-CAPRAE (L.) Roth.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

IPOMOEA PURPUREA (L.) Lam.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

IPOMOEA TAMNIFOLIA L.; see *Jacquemontia tamnifolia* (L.) Griseb.

IPOMOEA TRICHOCARPA Ell.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

IPOMOEA TRILOBA L.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

JACQUEMONTIA TAMNIFOLIA (L.) Griseb.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

QUAMOCLIT QUAMOCLIT (L.) Britton.
Albugo Ipomoeae-panduranae (Schwein.) Swingle.

QUAMOCLIT VULGARIS L.; see *Q. Quamoclit* (L.) Britton.

CUCURBITACEAE

BRYONOPSIS LACINIOSA ERYTHROCARPA Naud.
Pseudoperonospora cubensis (B. & C.) Rostow.

CITRULLUS VULGARIS Schrad.
Pseudoperonospora cubensis (B. & C.) Rostow.

COCCINIA INDICA Wight & Arn.
Pseudoperonospora cubensis (B. & C.) Rostow.

CUCUMIS ANGURIA L.
Pseudoperonospora cubensis (B. & C.) Rostow.

CUCUMIS ANGULATUS Forsk.
Pseudoperonospora cubensis (B. & C.) Rostow.

CUCUMIS DIPSACEUS Ehrenb.
Pseudoperonospora cubensis (B. & C.) Rostow.

CUCUMIS ERINACEUS; horticultural name for *C. dipsaceus* Ehrenb.

CUCUMIS MELO L.
Pseudoperonospora cubensis (B. & C.) Rostow.

CUCUMIS ODORATISSIMUS Moench.
Pseudoperonospora cubensis (B. & C.) Rostow.

CUCUMIS SATIVUS L.
Pseudoperonospora cubensis (B. & C.) Rostow.

CUCURBITA MAXIMA Duch.
Pseudoperonospora cubensis (B. & C.) Rostow.
CUCURBITA ESCULENTA S. F. Gray; see *Cucurbita Pepo* L.
CUCURBITA OVIFERA L.
Pseudoperonospora cubensis (B. & C.) Rostow.
CUCURBITA PEPO L.
Pseudoperonospora cubensis (B. & C.) Rostow.
CUCURBITA VERRUCOSA L.; see *C. Pepo* L.
CUCURBITACEAE, gen. et sp. ignot.
Pseudoperonospora cubensis (B. & C.) Rostow.
ECHINOCYSTIS LOBATA (Michx.) T. & G.; see *Micrampelis lobata* (Michx.) A. Gray.
LAGENARIA VULGARIS Ser.
Pseudoperonospora cubensis (B. & C.) Rostow.
MELOTHRIA SCABRA Naud.
Pseudoperonospora cubensis (B. & C.) Rostow.
MICRAMPELIS ECHINATA (Muhl.) B.S.P.; see *M. lobata* (Michx.) A. Gray.
MICRAMPELIS LOBATA (Michx.) A. Gray.
Pseudoperonospora cubensis (B. & C.) Rostow.
Rhysotheca australis (Speg.) G. W. Wilson.
MOMORDICA BALSAMINA L.
Pseudoperonospora cubensis (B. & C.) Rostow.
MOMORDICA CHARANTIA L.
Pseudoperonospora cubensis (B. & C.) Rostow.
MUKIA SCABRELLA Arn.
Pseudoperonospora cubensis (B. & C.) Rostow.
SICYOS ANGULATUS L.
Rhysotheca australis (Speg.) G. W. Wilson.
TRICHOSANTHES ANGUINA L.
Pseudoperonospora cubensis (B. & C.) Rostow.
TRICHOSANTHES COLUMBRINA Jacq.; see *T. Anguina* L.

DIPSACEAE

DIPSACUS SYLVESTRIS Huds.
Peronospora Dipsaci Tul.

EUPHORBIACEAE

CHAMAESYCE CORDIFOLIA (Ell.) Small.
Peronospora Euphorbiae Fuckel.
CHAMAESYCE GLYPTOSPERMA (Engelm.) Small.
Peronospora Euphorbiae Fuckel.
CHAMAESYCE HIRTULA (Engelm.) Small.
Peronospora Euphorbiae Fuckel.
CHAMAESYCE HUMISTRATA (Engelm.) Small.
Peronospora Euphorbiae Fuckel.
CHAMAESYCE MACULATA (L.) Small.
Peronospora Euphorbiae Fuckel.
CHAMAESYCE NUTANS (Lag.) Small.
Peronospora Euphorbiae Fuckel.
CHAMAESYCE SERPENS (H.B.K.) Small.
Peronospora Euphorbiae Fuckel.
CHAMAESYCE SERPYLLIFOLIA (Pers.) Small.
Peronospora Euphorbiae Fuckel.
CHAMAESYCE STICTOSPORA (Engelm.) Small.
Peronospora Euphorbiae Fuckel.
EUPHORBIA; see *Chamaesyce*.
EUPHORBIA HIRSUTA Engelm.; error for *E. hirtula* Engelm.
EUPHORBIA HYPERICIFOLIA A. Gray; see *Chamaesyce nutans* (Lag.) Small.
EUPHORBIA PRESLII Guss.; see *Chamaesyce nutans* (Lag.) Small.

FABACEAE

ASTRAGALUS CANADENSIS L.
Peronospora Trifoliorum de Bary.
ASTRAGALUS LOTIFLORUS Hook.
Peronospora Trifoliorum de Bary.
ASTRAGALUS sp.
Peronospora Trifoliorum de Bary.
MEDICAGO SATIVA L.
Peronospora Trifoliorum de Bary.
PHASEOLUS LUNATUS L.
Phytophthora Phaseoli Thaxter.
PISUM SATIVUM L.
Peronospora Viciae de Bary.
TRIFOLIUM CAROLINIANUM Michx.
Peronospora Trifoliorum de Bary.
TRIFOLIUM sp.
Peronospora Trifoliorum de Bary.
VICIA AMERICANA Muhl.
Peronospora Viciae de Bary.
VICIA AMERICANA LINEARIS S. Wats.; see *V. linearis* (Nutt.) Greene.
VICIA FABA L.
Peronospora Viciae de Bary.
VICIA LINEARIS (Nutt.) Greene.
Peronospora Viciae de Bary.
VICIA SATIVA L.
Peronospora Viciae de Bary.
VICIA sp.
Peronospora Viciae de Bary.

FUMARIACEAE

BICUCULLA CANADENSIS (Goldie) Millsp.
Peronospora Corydalis de Bary.
BICUCULLA CUCULLARIA (L.) Millsp.
Peronospora Corydalis de Bary.
BICUCULLA sp.
Peronospora Corydalis de Bary.
CAPNOIDES AUREUM (Willd.) Kuntze.
Peronospora Corydalis de Bary.
CAPNOIDES SEMPERVIRENS (L.) Borck.
Peronospora Corydalis de Bary.

CAPNOIDES sp.
Peronospora Corydalis de Bary.
CORYDALIS; see *Capnoides.*
CORYDALIS AUREA OCCIDENTALIS Engelm.; see *Capnoides aureum* (Willd.) Kuntze.
CORYDALIS GLAUCA Pursh; see *Capnoides sempervirens* (L.) Borck.
DICENTRA; see *Bicuculla.*

GERANIACEAE

GERANIUM CAROLINIANUM L.
Rhysotheca Geranii (Peck) G. W. Wilson.
GERANIUM DISSECTUM L.
Rhysotheca Geranii (Peck) G. W. Wilson.
GERANIUM MACULATUM L.
Rhysotheca Geranii (Peck) G. W. Wilson.
GERANIUM PUSILLUM Burm. f.
Rhysotheca Geranii (Peck) G. W. Wilson.
GERANIUM RICHARDSONII Fish. & Trautv.
Rhysotheca Geranii (Peck) G. W. Wilson.
GERANIUM ROBERTIANUM L.
Rhysotheca Geranii (Peck) G. W. Wilson.
GERANIUM sp.
Rhysotheca Geranii (Peck) G. W. Wilson.

GROSSULARIACEAE

GROSSULARIA DIVARICATA (Dougl.) Coville & Britton.
Rhysotheca ribicola (Schröt.) G. W. Wilson.
GROSSULARIA OXYACANTHOIDES (L.) Mill.
Rhysotheca ribicola (Schröt.) G. W. Wilson.
GROSSULARIA ROTUNDIFOLIA (Michx.) Coville & Britton.
Rhysotheca ribicola (Schröt.) G. W. Wilson.
RIBES ALBINERVUM Michx.; see *R. triste* Pall.
RIBES DIVARICATUM Dougl.; see *Grossularia divaricata* (Dougl.) Coville & Britton.
RIBES GLANDULOSUM Grauer.
Rhysotheca ribicola (Schröt.) G. W. Wilson.
RIBES HIRTELLUM Michx.; see *Grossularia oxyacanthoides* (L.) Mill.
RIBES OXYACANTHOIDES L.; see *Grossularia oxyacanthoides* (L.) Mill.
RIBES PROSTRATUM L'Hér.; see *R. glandulosum* Grauer.
RIBES ROTUNDIFOLIUM Michx.; see *Grossularia rotundifolia* (Michx.) Coville & Britton.
RIBES RUBRUM SUBGLANDULOSUM Maxim.; see *R. triste* Pall.
RIBES TRISTE Pall.
Rhysotheca ribicola (Schröt.) G. W. Wilson.

HYDROPHYLLACEAE

HYDROPHYLLUM MACROPHYLLUM Nutt.
Peronospora Hydrophylli Waite.
HYDROPHYLLUM VIRGINICUM L.
Peronospora Hydrophylli Waite.

LAMIACEAE

AGASTACHE NEPETOIDES (L.) Kuntze.
Peronospora Lophanthi Farlow.
AGASTACHE SCROPHULARIAEFOLIA (Willd.) Kuntze.
Peronospora Lophanthi Farlow.
HEDEOMA HISPIDA Pursh.
Peronospora Hedeomae K. & S.
LAMIUM AMPLEXICAULE L.
Peronospora Lamii A. Braun.
LOPHANTHUS; see *Agastache.*
SALVIA LANCEOLATA Willd.
Peronospora Lamii A. Braun.

LIMNANTHACEAE

FLOERKEA PROSERPINACOIDES Willd.
Peronospora Floerkeae Kellerm.

LINACEAE

LINUM SULCATUM Ridd.
Peronospora Lini Schröt.

ONAGRACEAE

GAURA PARVIFLORA Dougl.
Peronospora Arthurii Farl.
HARTMANNIA SPECIOSA (Nutt.) Small.
Peronospora Arthurii Farl.
MEGAPTERIUM MISSOURIENSE (Sims) Spach.
Peronospora Arthurii Farl.
OENOTHERA BIENNIS L.; see *Onagra biennis* (L.) Scop.
OENOTHERA LACINIATA Hill.
Peronospora Arthurii Farl.
OENOTHERA MISSOURIENSIS Sims; see *Megapterium missouriense* Spach.
OENOTHERA SINUATA L.; see *O. laciniata* Hill.
OENOTHERA SPECIOSA Nutt.; see *Hartmannia speciosa* (Nutt.) Small.
OENOTHERA sp.
Peronospora Arthurii Farl.
ONAGRA BIENNIS (L.) Scop.
Peronospora Arthurii Farl.

PAPAVERACEAE

ARGEMONE PLATYCERAS Coulter.
Peronospora arborescens (Berk.) de Bary.

PLANTAGINACEAE

PLANTAGO ARISTATA Michx.
Peronospora plantaginis Underw.
PLANTAGO LANCEOLATA L.
Peronospora alta Fuckel.
PLANTAGO MAJOR L.
Peronospora alta Fuckel.
PLANTAGO PATAGONICA ARISTATA (Michx.) A. Gray; see *P. aristata* Michx.
PLANTAGO RUGELII Decaisne.
Peronospora alta Fuckel.
PLANTAGO VIRGINICA L.
Peronospora alta Fuckel.
PLANTAGO sp.
Peronospora alta Fuckel.

POACEAE.

CHAETOCHLOA GLAUCA (L.) Scribn.
Sclerospora graminicola (Sacc.) Schröt.
CHAETOCHLOA ITALICA (L.) Scribn.
Sclerospora graminicola (Sacc.) Schröt.
CHAETOCHLOA VIRIDIS (L.) Scribn.
Sclerospora graminicola (Sacc.) Schröt.
CHAMAERAPHIS; see *Chaetochloa.*
CHLORIS ELEGANS H.B.K.
Sclerospora Farlowii Griff.
IXOPHORUS; see *Chaetochloa.*
SETARIA; see *Chaetochloa.*

POLEMONIACEAE

GILIA sp.
Peronospora Giliae E. & E.
PHLOX DIVARICATA L.
Peronospora phlogina D. & H.

POLYGONACEAE

POLYGONUM AVICULARE L.
Peronospora Polygoni Thümen.
POLYGONUM DUMETORUM L.; see *Tiniaria dumetorum* (L.) Opiz.
POLYGONUM DUMETORUM SCANDENS (L.) A. Gray; see *Tiniaria scandens* (L.) Small.
TINIARIA DUMETORUM (L.) Opiz.
Peronospora Polygoni Thümen.
TINIARIA SCANDENS (L.) Small.
Peronospora Polygoni Thümen.

PORTULACACEAE

CALANDRINIA MENZIESII Hook.
Peronospora Claytoniae Farl.
CLAYTONIA PERFOLIATA Donn; see *Montia perfoliata* (Donn) Howell.
CLAYTONIA VIRGINICA L.
Peronospora Claytoniae Farl.
MONTIA PERFOLIATA (Donn) Howell.
Peronospora Claytoniae Farl.
PORTULACA OLERACEA L.
Albugo Portulacae (DC.) Kuntze.

PRIMULACEAE

ANDROSACE OFFICINALIS Pursh.
Peronospora candida Fuckel.

RANUNCULACEAE

ANEMONE ACUTILOBA Laws.; see *Hepatica acutiloba* (Pursh) Britton.
ANEMONE CANADENSIS L.
Plasmopara pygmaea (Unger) Schröt.
ANEMONE DICHOTOMA L.; see *A. canadensis* L.
ANEMONE MULTIFIDA Poir.
Plasmopara pygmaea (Unger) Schröt.
ANEMONE NEMOROSA L.; see *A. quinquefolia* L.
ANEMONE PENNSYLVANICA L.; see *A. canadensis* L.
ANEMONE QUINQUEFOLIA L.
Plasmopara pygmaea (Unger) Schröt.
ANEMONE VIRGINIANA L.
Plasmopara pygmaea (Unger) Schröt.
ANEMONE sp.
Plasmopara pygmaea (Unger) Schröt.
HEPATICA ACUTA (Pursh) Britton.
Plasmopara pygmaea (Unger) Schröt.
HEPATICA ACUTILOBA DC.; see *H. acuta* (Pursh) Britton.
HEPATICA HEPATICA (L.) Karst.
Plasmopara pygmaea (Unger) Schröt.
HEPATICA TRILOBA Chaix; see *H. Hepatica* (L.) Karst.
RANUNCULUS ABORTIVUS L.
Peronospora Ficariae Tul.
RANUNCULUS ACRIS Tul.
Peronospora Ficariae Tul.
RANUNCULUS BULBOSUS L.
Peronospora Ficariae Tul.
RANUNCULUS FASCICULARIS Muhl.
Peronospora Ficariae Tul.
RANUNCULUS PENNSYLVANICUS L. f.
Peronospora Ficariae Tul.
RANUNCULUS RECURVATUS Poir.
Peronospora Ficariae Tul.
RANUNCULUS REPENS L.
Peronospora Ficariae Tul.
RANUNCULUS SEPTENTRIONALIS Poir.
Peronospora Ficariae Tul.
RANUNCULUS sp.
Peronospora Ficariae Tul.
THALICTRUM PURPURASCENS L.
Phytophthora Thalictri Wilson & Davis.

ROSACEAE

AGRIMONIA EUPATORIA L.; see *A. mollis* (T. & G.) Britton.
AGRIMONIA MOLLIS (T. & G.) Britton.
Peronospora Potentillae de Bary.
GEUM ALBUM Gmel.; see *G. canadense* Jacq.
GEUM CANADENSE Jacq.
Peronospora Potentillae de Bary.

GEUM MACROPHYLLUM Willd.
Peronospora Potentillae de Bary.
GEUM RIVALE L.
Peronospora Potentillae de Bary.
POTENTILLA GRANDIFLORA L.
Peronospora Potentillae de Bary.
POTENTILLA MONSPELIENSIS L.
Peronospora Potentillae de Bary.
POTENTILLA NORVEGICA L.; see *P. monspeliensis* L.
POTENTILLA NEPALENSIS Hook.
Peronospora Potentillae de Bary.
POTENTILLA sp.
Peronospora Potentillae de Bary.
ROSA CALIFORNICA Schlecht.
Peronospora sparsa Berk.
ROSA sp.
Peronospora sparsa Berk.
RUBUS BAILEYANUS Britton.
Peronospora Rubi Rabenh.
RUBUS CANADENSIS L.; see *R. procumbens* Muhl.
RUBUS NIGROBACCUS Bailey.
Peronospora Rubi Rabenh.
RUBUS OCCIDENTALIS L.
Peronospora Rubi Rabenh.
RUBUS PROCUMBENS Muhl.
Peronospora Rubi Rabenh.
RUBUS STRIGOSUS Michx.
Peronospora Rubi Rabenh.
RUBUS VILLOSUS Ait.; see *R. nigrobaccus* Bailey.
RUBUS VILLOSUS HUMIFUSUS T. & G.; see *R. Baileyanus* Britton.
RUBUS sp.
Peronospora Rubi Rabenh.

RUBIACEAE

GALIUM APARINE L.
Peronospora calotheca de Bary.
GALIUM BOREALE L.
Peronospora calotheca de Bary.
GALIUM LANCEOLATUM Torr.
Peronospora calotheca de Bary.
GALIUM TRIFLORUM Michx.
Peronospora calotheca de Bary.
GALIUM sp.
Peronospora calotheca de Bary.
HOUSTONIA MINOR (Michx.) Britton.
Peronospora Seymourii Burrill.
HOUSTONIA PATENS Ell.; see *H. minor* (Michx.) Britton.

SAXIFRAGACEAE

WHIPPLEA MODESTA Torr.
Peronospora Whippleae E. & E.

SCROPHULARIACEAE

LINARIA CANADENSIS (L.) Dumont.
Peronospora Linariae Fuckel.
SCROPHULARIA CALIFORNICA Cham.
Peronospora sordida B. & Br.
SCROPHULARIA MARILANDICA L.
Peronospora sordida B. & Br.
SCROPHULARIA NODOSA L.; see *S. marilandica* L.
SCROPHULARIA NODOSA MARILANDICA A. Gray; see *S. marilandica* L.
SCROPHULARIA sp.
Peronospora sordida B. & Br.
VERONICA ALPINA L.; see *V. Wormskioldii* R. & S.
VERONICA ANAGALLIS L.; see *V. Anagallis-aquatica* L.
VERONICA ANAGALLIS-AQUATICA L.
Peronospora grisea Unger.
VERONICA ARVENSIS L.
Peronospora grisea Unger.
VERONICA PEREGRINA L.
Peronospora grisea Unger.
VERONICA WORMSKIOLDII R. & S.
Peronospora grisea Unger.
VERONICA sp.
Peronospora grisea Unger.

SOLANACEAE

LYCOPERSICON LYCOPERSICON (L.) Karst.
Phytophthora infestans (Mont.) de Bary.
NICOTIANA GLAUCA Graham.
Peronospora Nicotianae Speg.
SOLANUM LYCOPERSICON L.; see *Lycopersicon Lycopersicon* (L.) Karst.
SOLANUM TUBEROSUM L.
Phytophthora infestans (Mont.) de Bary.

STERCULIACEAE

THEOBROMA CACAO L.
Phytophthora Cactorum (C. & L.) Schröt.

ULMACEAE

CELTIS OCCIDENTALIS L.
Pseudoperonospora Celtidis (Waite) G. W. Wilson.

URTICACEAE

LAPORTEA CANADENSIS Gaud.; see *Urticastrum divaricatum* (L.) Kuntze.
PARIETARIA PENNSYLVANICA Muhl.
Rhysotheca illinoiensis Farlow.
URTICA GRACILIS Ait.
Peronospora Urticae de Bary.
URTICA sp.
Peronospora Urticae de Bary.
URTICASTRUM DIVARICATUM (L.) Kuntze.
Peronospora Urticae de Bary.

VIOLACEAE

VIOLA ODORATA L.
Peronospora Violae de Bary.

VIOLA RAFINESQUII Greene.
Peronospora Violae de Bary.

VIOLA TENELLA Muhl.; see *V. Rafinesquii* Greene.

VIOLA TRICOLOR L.
Peronospora Violae de Bary.

VIOLA TRICOLOR ARVENSIS Hook.; see *V. Rafinesquii* Greene.

VITACEAE

AMPELOPSIS QUINQUEFOLIA (L.) Michx.; see *Parthenocissus quinquefolia* (L.) Planch.

AMPELOPSIS RICHII; error for *A. Veitchii*.

AMPELOPSIS VEITCHII; horticultural name for *Parthenocissus tricuspidata* (Sieb. & Zucc.) Planch.

PARTHENOCISSUS QUINQUEFOLIA (L.) Planch.
Rhysotheca viticola (B. & C.) G. W. Wilson.

PARTHENOCISSUS TRICUSPIDATA (Sieb. & Zucc.) Planch.
Rhysotheca viticola (B. & C.) G. W. Wilson.

VITIS AESTIVALIS Michx.
Rhysotheca viticola (B. & C.) G. W. Wilson.

VITIS BICOLOR LeConte.
Rhysotheca viticola (B. & C.) G. W. Wilson.

VITIS CALIFORNICA Hook. & Arn.
Rhysotheca viticola (B. & C.) G. W. Wilson.

VITIS CINEREA Engelm.
Rhysotheca viticola (B. & C.) G. W. Wilson.

VITIS CORDIFOLIA Michx.
Rhysotheca viticola (B. & C.) G. W. Wilson.

VITIS LABRUSCA L.
Rhysotheca viticola (B. & C.) G. W. Wilson.

VITIS RIPARIA L.; see *V. vulpina* L.

VITIS ROTUNDIFOLIA Michx.
Rhysotheca viticola (B. & C.) G. W. Wilson.

VITIS VINIFERA L.
Rhysotheca viticola (B. & C.) G. W. Wilson.

VITIS VULPINA L.
Rhysotheca viticola (B. & C.) G. W. Wilson.

VITIS sp.
Rhysotheca viticola (B. & C.) G. W. Wilson.

NEW YORK BOTANICAL GARDEN.

INDEX TO AMERICAN BOTANICAL LITERATURE

(1908)

The aim of this Index is to include all current botanical literature written by Americans, published in America, or based upon American material; the word America being used in its broadest sense.

Reviews, and papers which relate exclusively to forestry, agriculture, horticulture, manufactured products of vegetable origin, or laboratory methods are not included, and no attempt is made to index the literature of bacteriology. An occasional exception is made in favor of some paper appearing in an American periodical which is devoted wholly to botany. Reprints are not mentioned unless they differ from the original in some important particular. If users of the Index will call the attention of the editor to errors or omissions, their kindness will be appreciated.

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Bailey, W. W. Tricky plants. Am. Bot. **14**: 67, 68. [O] 1908.

Ball, O. M. Formation of adventitious roots in the umbrella China tree. Bot. Gaz. **46**: 303, 304. *f. 1, 2.* 17 O 1908.

Becker, W. *Viola gracillima* var. *incisa* W. Becker, nov. var. Repert. Nov. Spec. **5**: 46. 15 F 1908.
Native in Brazil.

Berger, A. *Cereus Beneckii* Ehrenb. Monats. Kakteenk. **18**: 134, 137, 138. 15 S 1908.

Berry, E. W. A Miocene cypress swamp. Torreya **8**: 233–235. 22 O 1908.

Berry, E. W. A new cretaceous *Bauhinia*. Torreya **8**: 218, 219. 26 S 1908.
Bauhinia marylandica.

Børgesen, F. The species of Avrainvilleas hitherto found on the shores of the Danish West Indies. Vid. Medd. Naturh. For. Kjöbenhavn **1908**: 27–44. *pl. 3.* Je 1908.

Bouly de Lesdain, M. Notes lichénologiques — VIII. Bull. Soc. Bot. France **55**: 420–424. 11 Au 1908.
Includes *Lecidea Stanaaerti* sp. nov., native in Peru.

Broadhurst, J. Nomenclature. Torreya **8**: 236, 237. 22 O 1908.

Broadway, W. E. The orchids of Grenada, West Indies. Gard. Chron. III. **44**: 228, 229. 26 S 1908.

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Includes *Cylindrosporium Pomi* sp. nov.

Burlingame, L. L. The staminate cone and male gametophyte of *Podocarpus*. Bot. Gaz. **46**: 161–178. *pl. 8, 9 + f. A, B, 1.* 22 S 1908.

Clute, W. N. Rare forms of ferns — VII. A slender-leaved *Cystopteris*. Fern Bull. **16**: 75–77. [S] 1908. [Illust.]

Cockerell, T. D. A. A new name for *Euphorbia montana*. Muhlenbergia **4**: 56. 26 S 1908.
Tithymalus philorus.

Cockerell, T. D. A. Some aspects of the Florissant expeditions of 1908. Am. Nat. **42**: 569–581. *f. 1–12.* 30 S 1908.

Collins, F. S. Notes on algae — IX. Rhodora **10**: 155–164. 30 S 1908.
Includes *Pilinia endophytica* sp. nov., endophytic in *Ralfsia Borneti.*

Cook, O. F. The spreading of Mendelian characters. Science II. **28**: 519, 520. 16 O 1908.

Crocker, W., & Knight, L. I. Effect of illuminating gas and ethylene upon flowering carnations. Bot. Gaz. **46**: 259–276. *f. 1–4.* 17 O 1908.

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Dietel, P. Einige neue Uredineen aus Südamerika — II. Ann. Myc. **6**: 94–98. 31 My 1908.
Includes ten new species.

Dode, L. A. *Carya Diguetii* spec. nov. Bull. Soc. Bot. France **55**: 470, 471. 11 Au 1908.
Native of Mexico.

Dorety, H. A. The seedling of *Ceratozamia*. Bot. Gaz. **46**: 203–220. *pl. 12–16 + f. 1, 2.* 22 S 1908.

Eckerson, S. H. The number and size of the stomata. Bot. Gaz. **46**: 221–224. 22 S 1908.

Eichlam, F. Mitteilungen aus Zentral-Amerika. Monats. Kakteenk. **18**: 138–143. 15 S 1908.

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Foslie, M. Algologiske notiser — V. Kgl. Norske. Vid. Selsk. Skr. **1908**[7]: 1–20. 1908.

Greene, E. L. Novitates boreali-americanae — I. Repert. Nov. Spec. **5**: 45, 46. 15 F 1908; — II. 241–244. 20 Au 1908.
Include new species in *Antennaria*, *Arabis* (11), *Convallaria* (2), and *Rhus* (3).

Gürke, M. *Cereus Spegazzinii* Web. und *C. Anisitsii* K. Schum. Monats. Kakteenk. **18**: 129–133. 15 S 1908.

Hackel, E. *Gramineae* novae — III. Repert. Nov. Spec. **5**: 1. 20 Ja 1908.
Paspalum Usteri sp. nov. from Brazil.

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Includes many new species in numerous families.

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Holm, T. *Sisyrinchium*: anatomical studies of North American species. Bot. Gaz. **46**: 179–192. *pl. 10–11A*. 22 S 1908.

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Includes *C. cyclostegius*, and *C. illecebrosus* spp. nov.

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Includes 4 new species of *Epilobium* from northern North America.

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Includes 3 new species from North America.

Loew, O. Note on balanced solutions. Bot. Gaz. **46**: 302, 303. 17 O 1908.

Maire, R. Champignons de Sao Paulo (Brésil) — I. Ann. Myc. **6**: 144–153. *pl. 1* + *f. 1–7.* 31 My 1908.
Includes *Maireella* Syd. gen. nov., and 7 new species.

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Includes 3 new species from Brazil.

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Includes *B. Vanderbiltianus* sp. nov.

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Includes new species in *Apopetalum* (2), a new genus of the *Rosaceae*, *Gamardia*, *Cotoneaster*, *Acalypha* (2), and *Buddleia*.

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Includes 6 new species.

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Includes 4 new species.

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Includes 6 new species.

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Rick, J. *Fungi* austro-americani — fasc. IX u. X. Ann. Myc. **6**: 105–108. 31 My 1908.
Includes *Fusicoccum Kesslerianum* sp. nov.

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Includes 2 new species in *Polypodium* from Ecuador.

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Includes new species in *Gleichenia* (2), *Hymenophyllum*, *Adiantum* (2), *Blechnum*, *Diplazium*, *Dryopteris* (2), *Polypodium* (4), *Notochlaena*, and *Lycopodium*.

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[Translated and reprinted from the Centralb. gesammt. Forstw. **1907**: 325–330.]